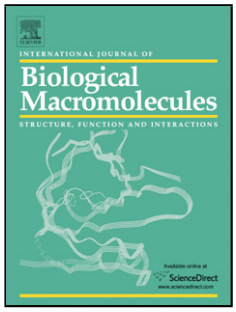

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Preparation and characterization of reinforced papers using nano bacterial cellulose

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Abstract

The main goal of this work was to reinforce softwood pulp (SP) with bacterial cellulose (BC) to generate a sustainable biocomposite. BC is a nanocellulose, which was anticipated to increase interfacial adhesion between the cellulosic fibers and BC. The organism used was *Gluconacetobacter xylinus*, which was incubated in a static Hestrin-Schramm culture at 28 °C for 14 days. The specimens of BC, SP and the reinforced SP with BC were characterized using X-ray diffraction (XRD), FT-IR, FESEM, and physico-mechanical testing. The crystallinity index was found to be 83 and 54% for BC and SP, respectively. FT-IR spectra showed that the composition of BC was fully different from that of SP fibers. Based on FESEM images, one can conclude that BC and softwood fibers do form a good combination with a nonporous structure. BC fibers fill in among the softwood fibers in the sheet. The physical and mechanical properties showed that as the dosage of BC increased, the properties of tensile index, tear index, and burst index greatly improved, while the porosity and the elongation decreased. The reason for the improved